Title: Leasehold Reform Proposals in England and Wales: The unconsidered financial implications of reducing the premium in lease extensions

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Leasehold Reform Proposals in England and Wales: The unconsidered financial implications of reducing the premium in lease extensions

Abstract

Leaseholds are finite assets sold at a discount to its freehold value. The government intends to make it easier and cheaper for lessees to renew their lease or purchase the freehold interest. We analyse the potential financial implications of leasehold reform from changing the extended lease length and eliminating the marriage value payment beyond the distribution of a premium reduction. Lessees who extend a short lease will benefit from a premium reduction and from the increase in the extended leasehold value from a long to a very long lease. We argue that lessees' who do not extend also benefit from the capitalisation of the premium reduction into short leasehold prices. We find that there will be regional variations in the increase in the short leasehold stock value, decreases in housing affordability and in how financial gains are distributed among different lessee types. Some of these outcomes contradict current government policy. We also find that owning a freehold share does not protect against selling at a price discount.

Key words: leasehold reform**,** marriage value payment, capitalised leasehold prices

Introduction

In England and Wales, the current legal forms of owning a residential dwelling are the freehold, the leasehold, the share of freehold and commonhold. Most apartments are owned as a leasehold interest while the building and the land they sit on are owned separately as freehold interests. The freeholder (lessor) is responsible for maintaining the condition of the land and the building. A leasehold is a legal contact conferring the holder of this legal interest (the lessee) exclusive rights to live or rent out the dwelling for the duration of the lease. It is a deteriorating asset as ownership reverts to the freeholder upon its expiration. The leasehold value relative to its Freehold Vacant Possession (FHVP) value, known as Relativity, declines as the lease expires. A short lease sells at a large discount compared to its FHVP value. Leases often have certain obligations attached to them which a lessee must abide by, such as the payment of a ground rent.

In recent years, the residential leasehold system of ownership has been in the spotlight because of the inclusion of unfair clauses in newly created leases, making it difficult for lessees to sell them. The Leasehold Reform (Ground Rent) Act 2022 addresses the escalating ground rent issue for the creation of new leases. A second set of legislative reforms will target existing leaseholds. The government has stated that it intends to make leasehold extensions "easier, faster, fairer and cheaper" for both houses and apartments (Wilson and Barton 2021).

Two important pieces of historic legislation have shaped the leasehold system into its current form. The Leasehold Reform, Housing and Urban Development Act 1993 extended enfranchisement rights to apartments, conferring lessees the right to extend their lease by an additional 90 years or collectively acquire the freehold. The Commonhold and Leasehold Reform Act 2002 introduced the commonhold, a new form of collective freehold ownership, and an 80-year cut-off point for the marriage value payment in the premium to reduce uncertainty and avoid disputes over which lease length it should become payable.

The impetus for further reform is caused by disputes continuing to arise between lessees and lessors. Leaseholders are reluctant to seek a resolution through the complex Tribunal system. There is also the possibility they will become liable for the lessor's legal costs. The existing commonhold system as a solution to some of these problems has proven to be unpopular in its current form.

Our paper considers the financial implications of the Law Commission's proposals (which have been publicly accepted by the government[1]) to reduce the premium for extensions to existing leases. We focus on proposals to abolish the marriage value payment and extend leases to a maximum length of 990 years at zero ground rent. Our analysis considers the financial implications beyond the distribution of a reduced premium. The foundation for assessing the financial implications rests on the realisation that a premium reduction does not affect the freehold value but the distribution of the share of its value between the freehold and leasehold legal interests in the dwelling. We identify and model the channels explicitly and distinguish between different types of lessees in assessing the distribution of financial gains. Our method comprises of two parts: (i) hedonic apartment price models to validate price discounts, test for the presence of a freehold premium, assess the effectives of owning a share of the freehold as protection against having to sell at a price discount and obtain the inputs required for a numerical analysis; and (ii) an option pricing model to examine the impact on short leasehold prices, which then allows us to consider the financial consequences to the market, lessees and lessors.

As expected, the lessors' loss is approximately equal to the reduced premium. Lessees who renew their short leasehold benefit by this amount but also gain from the extended leasehold value being a very long (990 years) rather than long lease (existing lease length plus 90 years). In addition, lessees who choose not to extend will benefit from reduced premium being capitalised into higher leasehold prices. The channel is the rise in the anticipated payoff from extending a short lease which increases the embedded option value. The estimated average gain for lessees from this source is about 8.5% of the FHVP value.

Reducing the premium affects housing affordability and distribution of the windfall financial gains among lessee types. At the national level, we estimate that the immediate effect from the capitalization of the reduced premium into prices will increase the value of the short leasehold stock by about £10.9 bn, which translates to an average price rise of a short leasehold by around 9.9%. The short-term effect on the entire leasehold market is a 1% rise in prices. The longer-term effect, on the assumption that all short leaseholds are extended, is a 3.2% price increase nationally. Financial gains from the reform are not confined to owner occupier lessees as investors are the largest recipients.

We highlight how the consequences vary regionally. The largest deterioration in housing affordability in the short and long term is in the North East, West Midlands, Wales and East Midlands. Short leaseholds provide a route for lower-income households to own a home, particularly in London and the southern regions. We

[1] https://www.lawcom.gov.uk/project/leasehold-enfranchisement/

estimate that the reforms could lead to longer term price rises in these regions by an average 2.5%.

Investors are the largest recipients in London, the southern regions, and East Midlands and middle-income occupier lessees in the remaining regions. Low-income occupier lessees are the second largest beneficiaries in London, the southern regions, East Midlands and the North West. There are gains too for significant numbers of high-income households in the West Midlands, London, North East and Wales.

Investors in London and the southern regions tend to rent out short leaseholds to low-income households. The reforms provide them with an incentive to either realise the capital gain and sell up if short leasehold prices rise or extend their lease and refurbish the dwelling to achieve higher rental income, both of which would lead to a decrease in cheaper rented accommodation in the private sector. Finally, the total effect is likely to be higher than our reported results due to the pipeline of leases turning short in the future.

The next section reviews the literature, highlighting the pertinent issues. Section three outlines the methodology comprising of the study context, our aims and objectives, the theoretical model, our data and the estimation strategies employed. The fourth section reports our hedonic model and numerical analysis results. Conclusions are then drawn.

Literature review

The Law Commission produced four final reports on leasehold reform, a general report (number 392) and three reports considering specific issues pertaining to the right to manage (number 393), facilitating the conversion to a commonhold system of ownership (number 394), and various proposals to reduce the premium paid for a leasehold extension and enfranchisement (number 387 or the Valuation report).

The Valuation report concluded that it is impossible to decrease the premium without reducing the compensation to the lessor[2]. Its analysis of the financial implications is confined to the distribution of the change in the premium among lessee and lessors. The report presented a series of options but did not make any specific recommendations. The government has publicly announced the acceptance of some the Law Commission's proposals (Hansard 2021). Of relevance to this paper are: (i) to give leaseholders the right to extend their lease by a maximum term of 990 years at zero ground rent; (ii) to abolish marriage value; (iii) to cap the treatment of ground rents at 0.1% of the freehold value and prescribe rates for the premium calculations.

In the academic literature, empirical studies have attempted to estimate the price discount of leaseholds to either reveal the net rate used by households to discount cash-flows over long time periods (Giglio et al. 2015) or to address the Relativity conundrum (Grover 2014). The two strands are related. As a deteriorating asset, a leasehold is sold at a discount compared to its FHVP value. Equivalently, it has a Relativity curve. Giglio et al. (2015), Bracke et al. (2018) and Lai and Micheva (2021) estimated the price discount to extract the net discount rate. Since they used data after enfranchisement had been granted, Andrew et al. (2022) pointed out that their price discounts reflect the enfranchised Relativity. These studies reported small and large price discounts for long and short leases respectively.

Giglio et al. (2015) and Lai and Micheva (2021) employed lease buckets to capture the effect of different maturities on prices in their hedonic models. Bracke et al. (2018) and Savills (2016) adopted a two-step estimation approach. Both studies employed dummy variables to capture the unexpired lease effect on dwelling prices but applied different techniques in the second step to obtain Relativity. Savills (2016) imposed theoretical restrictions to justify fitting an exponential function while Bracke et al. (2018) applied a second-degree local polynomial with an adjusted bandwidth to their lease dummy estimates. Andrew et al. (2022) adopted the same procedure as Bracke et al. (2018) but additionally estimated hedonic models containing a linear spline, a smoothed linear spline, and a right-tailed restricted cubic spline to capture the enfranchised Relativity and avoid the problem caused by sparse observations at certain lease lengths.

Grover (2014) discussed enfranchisement and the issues raised in determining the unenfranchised Relativity curve. He recommended that attempts should be made to obtain a definitive Relativity graph using information from a larger sample than the proprietary Relativity curves constructed by agents. Badarinza and Ramadorai (2015)

[2] The Law Commission focused on premium reform proposals compatible with lessor rights under Article 1 of the First Protocol (A1P1) to the European Convention on Human Rights. A1P1 has been incorporated into English Law by the Human Rights Act 1998.

and Dixon et al. (2000) attempted to extract the unenfranchised Relativity from Leasehold Valuation Tribunal (LVT) data. Bracke et al. (2018) argued that this dataset is inappropriate for obtaining the profile of discount rates due to the complexities of the case law and statute, and the relatively small number of cases available.

Lai and Milcheva (2021) applied Repeat Sales models with lease buckets and lease dummies on Land Registry data to capture the enfranchised Relativity and extract the net discount rates. Bracke et al. (2018), Savills (2016) and Andrew et al. (2022) explicitly attempted to derive the unenfranchised Relativity. These studies used Prime Central London (PCL) data, applied hedonic models in estimation and reported significantly large price discounts for short leases. Bracke et al. (2018) used pre-enfranchisement data to estimate the price discounts and the unenfranchised Relativity. Savills (2016) used four reference points from the Upper Tribunal data to derive the unenfranchised Relativity from the enfranchised Relativity curve. Andrew et al. (2022) adopted an alternative approach and derived the unenfranchised Relativity from the enfranchised Relativity by applying an option pricing simulation model.

Methodology

Study Context

Under the existing leasehold system, the lessee has the right to extend a lease at any length by serving a section 42 notice. The lessor receives compensation from the lessee in the form of a premium based on the relevant considerations at the date the notice is served. For short leases, the premium comprises of three components: (i) compensation for the lessor's forgone ground rent; (ii) compensation for the delay in reversion to the lessor; and (iii) half the marriage value[3]:

$$Premium^{T} = \frac{\left[1-(1+\tau)^{-T}\right]}{\tau}\kappa + \left[\frac{1}{(1+\lambda)^{T}}\mathrm{FHVP} - \frac{1}{(1+\lambda)^{T+90}}FHVP\right] + \frac{1}{2}\left[\left(VE^{T+90} + \frac{1}{(1+\lambda)^{T+90}}FHVP\right) - \left(V^{T} + \frac{1}{(1+\lambda)^{T}}FHVP + \frac{\left[1-(1+\tau)^{-T}\right]}{\tau}\kappa\right)\right] \quad (1)$$

where:
κ =per period ground rent (non-escalating)
τ =capitalisation rate for ground rent
λ = deferment (discount) rate
T = number of years remaining
VE^{T+90} = the extended enfranchised leasehold value
V^{T} = the existing unenfranchised leasehold value
$FHVP$ = the freehold vacant possession value
γ = per period ground rent

The first term represents foregone ground rent, the second term the reversionary value and the third term half the marriage value. The marriage value is only payable when the lease has 80 years or less left. The marriage value is designed to ensure that both

[3] In the case of purchasing the freehold, the premium is adjusted by replacing the lessor's new reversionary interests with compensation for `hope value', the potential development value if the lease is near termination. Our analysis focuses on leasehold extensions, but our method can incorporate enfranchisement implications too.

the lessor and lessee equally share in any additional gain from an uplift in the value of the apartment following a lease extension, capturing the difference between the combined new and combined existing legal interests. The marriage value's relative importance in determining the premium initially rises but then decreases as the reversionary component dominates the calculation in very short leases (20 years and under).

There is, however, a conundrum. To highlight it, the premium can be expressed relative to its FHVP value:

$$S^T = \frac{\left[1-(1+\tau)^{-T}\right]}{\tau}\frac{\kappa}{FHVP} + \left[\frac{1}{(1+\lambda)^T} - \frac{1}{(1+\lambda)^{T+90}}\right] + \frac{1}{2}\left[\left(RCE^{T+90} + \frac{1}{(1+\lambda)^{T+90}}\right) - \left(RC^T + \frac{1}{(1+\lambda)^T} + \frac{\left[1-(1+\tau)^{-T}\right]}{\tau}\frac{\kappa}{FHVP}\right)\right] \quad (2)$$

where:

$S^T = \frac{Premium^T}{FHVP}$, the premium rate

$RC^T = \frac{V^T}{FHVP}$, the unenfranchised Relativity of the existing lease

$RCE^{T+90} = \frac{VE^{T+90}}{FHVP}$, the enfranchised Relativity of the extended lease

The premium rate is larger when the extended enfranchised Relativity (RCE^{T+90}) and the unenfranchised Relativity (RC^T) take higher and lower values respectively, and vice versa. The enfranchised Relativity can be obtained from 'comparables' or appropriately specified hedonic models. The conundrum concerns the unenfranchised Relativity as it requires information on leasehold values when lessees do not have rights to renew their leases. Agents apply proprietary unenfranchised Relativity curves and heuristics in extension negotiations. The Law Commission argues that this solution causes uncertainty, raises transaction costs and leads to disputes. The unenfranchised Relativity conundrum is discussed in more detail and addressed in Andrew et al. (2022).

The capitalisation (τ) and deferment (λ) rates for extending leases with 20 and more years left are based on statutory values set by the Lands Tribunal in Earl Cadogan v Sportelli (2007) 1 EGLR 153. For apartments in PCL, these are $\lambda = 5.0\%$ and $\tau = 6.0\%$. Adjustments are made for very short leases (20 to 10 years) to reflect recent market conditions. For extremely short leases (10 years and under), net rental yields are used to represent the unenfranchised Relativity.

Under the proposals which the government has publicly announced will be adopted, the (post-reform) premium rate[4] becomes:

$$S^T_{Reform} = \frac{\left[1-(1+\tau)^{-T}\right]}{\tau}\frac{\kappa}{FHVP} + \left[\frac{1}{(1+\lambda)^T} - \frac{1}{(1+\lambda)^{990}}\right] \quad (3)$$

[4] The capitalisation of the ground rent component will be restricted to a maximum of 0.1 percent of the freehold value. In equation (3), this implies that $0 \leq \frac{\kappa}{FHVP} \leq 0.001$. As an onerous ground rent payment is more relevant for recently created leases and does not affect most existing leaseholds (Giglio et al. 2015b), we do not examine this implication in the paper.

where:
the extended term is standardised to 990 years.

For long leases, the government will allow leaseholders to buy out the ground rent without any need to extend the lease.

The government is also considering reforms to prescribing values for the capitalisation and deferment rates but have yet to announce these. We do not examine these possible changes in our analysis, but our analytical framework can incorporate them.

Aims and Objectives
We examine the financial implications of changes to the premium when leases are extended to a maximum 990 years with zero ground rents and the marriage value payment is eliminated. Our analysis focuses on leaseholds with 80 or less years remaining. We present a theoretical framework to identify the channels in which this premium reduction could impact on lessors and lessees. Hedonic apartment price models are estimated to validate the existence of Relativity, derive the pre-reform enfranchised Relativity curve, test for the presence of a freehold share premium and assess whether owning a share of the freehold negates the effect of a price discount from lease expiration. The hedonic model further provides the required inputs for the option price simulation model to obtain the post-reform Relativity curve with which we use to examine the broader financial implications of a premium reduction[5].

Theoretical Framework
We next outline the channels in which a premium reduction affects lessor and lessee legal interests. The freehold vacant possession (FHVP) value is distributed between the lessor (freehold) and lessee (leasehold) legal interests. Following a lease extension, the decrease in the value of the lessor interest is accompanied by the receipt of a premium while the increase in the lessee interest is accompanied by this deduction. Under the existing and reform regimes, the extension of a lease of length T implies:

Pre-reform regime:

$$freehold\ interest = \frac{1}{(1+\lambda)^{T+90}} FHVP + Premium^{T}$$

$$leasehold\ interest = RCE^{T+90} FHVP\ - Premium^{T}$$

Post-reform regime:

$$freehold\ interest = \frac{1}{(1+\lambda)^{990}} FHVP + Premium^{T}_{Reform}$$

$$leasehold\ interest = RCE^{990}_{Reform} FHVP - Premium^{T}_{Reform}$$

[5] We abstract from `hope' value or issues pertaining to development rights in the premium calculation which mainly affect leases near the point of expiration.

where:

$\frac{1}{(1+\lambda)^{T+90}} FHVP =$ pre-reform new freehold interest

$RCE^{T+90} FHVP =$ pre-reform new leasehold interest

$\frac{1}{(1+\lambda)^{990}} FHVP =$ post-reform new freehold interest

$RCE^{990}_{Reform} FHVP =$ post-reform new leasehold interest

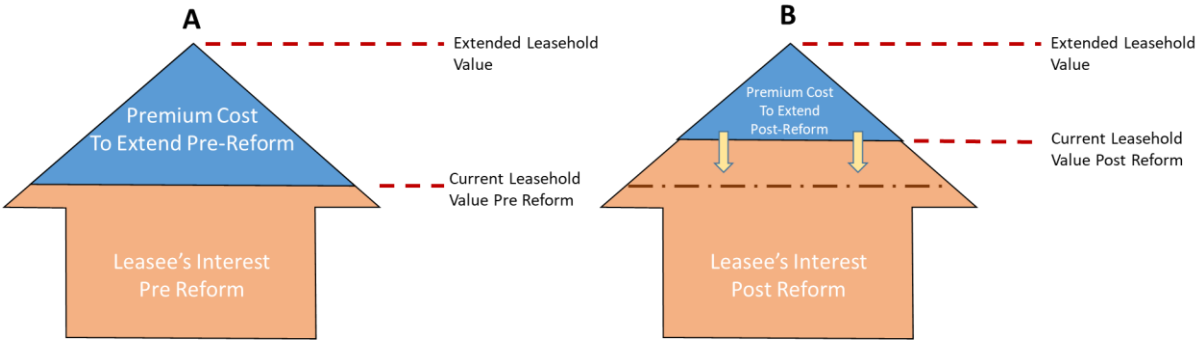
From the above, the financial implications for the lessor can be represented by the change in the value of the premium, $Premium^{T} - Premium^{T}_{Reform}$, as $\frac{1}{(1+\lambda)^{T+90}}$ and $\frac{1}{(1+\lambda)^{990}}$ are approximately equal to zero when extended lease lengths are greater than 99 years. For very short leaseholds, the lessor's interest will decline further since $\frac{1}{(1+\lambda)^{990}} < \frac{1}{(1+\lambda)^{T+90}}$. Note that changes to the deferment and capitalisation rates adversely affecting lessors lead to a further deterioration in the value of the lessor's new interest.

The lessee benefits from the reduction in the premium $\left(Premium^{T} - Premium^{T}_{Reform}\right)$ and the increased value in the extended lease $\left(RCE^{990}_{Reform} - RCE^{T+90}\right)FHVP$. RCE^{990}_{Reform} represents the enfranchised Relativity of a very long lease but RCE^{T+90} depends on the pre-extension lease length, T. For short leaseholds, the term RCE^{T+90} will likely represent the long lease (under 900 years).

However, lessee's do not have to extend their lease to benefit from a reform reducing the premium as they can benefit indirectly from the increase in the short leasehold value as figure 1 illustrates[6].

[Insert Figure 1 Capitalisation of reduction in the premium here]

Figure 1: Capitalisation of reduction in the premium



[6] The illustration assumes that the extended leasehold by 90 years is similar to one extended to 990 years. In practice there will be a small difference.

The diagrams decompose the extended leasehold value into the premium payment and the value of the lessee's existing interest. Reforms designed to reduce the premium lead to its capitalisation into the lessee's interest resulting in an increase in the existing leasehold value, as shown by the arrows in the right diagram. This change can be represented by the enfranchised Relativity:

Pre-reform regime:

$existing\ leasehold\ interest = RCE^{T}$
$new\ leasehold\ interest = RCE^{T+90}$

Post-reform regime:

$existing\ leasehold\ interest = RCE^{T}_{Reform}$
$new\ leasehold\ interest = RCE^{990}_{Reform}$

The capitalisation of a premium reduction leads to an upward adjustment to the enfranchised Relativity when the lease length is short but remains the same when it is very long, $RCE^{T} \leq RCE^{T}_{Reform}$. This adjustment will be greatest for short lease lengths between 20 and 80 years. For longer leases, the impact will be reduced as the marriage value is not applicable but also because leasehold values are close to the FHVP value. The effect on very short leases (20 years and under) will be dampened by the reversionary component in the premium determination. By contrast, the analysis undertaken in the Law Commission's Valuation report implicitly assumes the enfranchised Relativity remains unchanged. It also ignores the lessee's gain from the increase in the extended leasehold value from a long lease to a very long lease.

Modelling the channels

The change to the enfranchised Relativity can be captured using the model developed by Andrew et al. (2022). As lessees have the right but not the obligation to extend their lease, the value of the enfranchised leasehold with T years unexpired ($\mathrm{VE_t^T}$) is the value of the unenfranchised leasehold (V_t^T) plus the option value (C_t^T):

$$\mathrm{VE_t^T} = V_t^T + C_t^T \qquad (4)$$

The option value incorporates the lessee's anticipated financial payoff from extending the lease. At each lease length, the anticipated payoff reflects the gain from the uplift in leasehold values net of the premium paid, taking into consideration future house price growth and volatility.

The FHVP is unaffected by changes to the premium. Nor is the unenfranchised leasehold value since the difference between them only depends on the lease length. Using the Gordon growth formula to express the existing unenfranchised leasehold value as a net discount rate:

$$V_t^T = RC_t^T FHVP_t = \left[1 - \frac{(1+g)^T}{(1+r)^T}\right]\frac{rent}{r-g} \qquad (5)$$

where:

$FHVP = \frac{rent}{r-g}$

$RC_t^T = \left[1 - \frac{(1+g)^T}{(1+r)^T}\right]$ = unenfranchised Relativity
r =discount rate
g = growth rate

Equation (5) reveals that changes to the premium do not affect the net discount rate, $r - g$, or rent[7]. The relationship between the enfranchised and unenfranchised Relativities and option value is:

$$\mathrm{RCE}_{\mathrm{t}}^{\mathrm{T}} = RC_t^T + \frac{C_t^T}{FHVP_t} \quad (6)$$

where:
RCE_t^T =the enfranchised Relativity
$\frac{C_t^T}{FHVP}$ = option value relative to the FHVP value

The option value is mainly applicable to short leases and less relevant for long leases as the uplift in values from a lease extension in the latter closely matches the premium paid[8]. The capitalisation of a reduced premium leads to an upward adjustment in the enfranchised Relativity brought about by the change in the option value, as the anticipated payoff increases at each lease length. The post-reform enfranchised Relativity can be obtained by adding the post-reform option value to the unenfranchised Relativity.

$$\mathrm{RCE}_{\mathrm{Reform,t}}^{\mathrm{T}} = RC_t^T + \frac{C_{Reform,t}^T}{FHVP_t} \quad (7)$$

where:
$\frac{C_{Reform,t}^T}{FHVP_t}$ = post-reform option value relative to the FHVP value

Details on how we obtain our unenfranchised Relativity curve can be found in Andrew et al. (2022). Here, the focus is on outlining the option pricing model to capture the adjustment to the enfranchised Relativity[9].

Option Pricing Model
The option value is the unconditional expected payoff from extending a lease over the entire unexpired lease term:

$$E\left[\eta_{Reform,t}^T\right] = E\left[E\left(\eta_{Reform,t}^T | exercised_t\right)\right] \quad (8)$$

The expected conditional payoff if the lease was at extended at a particular lease length T is:

$$E\left(\eta_{Reform,t}^T | exercised_t = T\right)$$

[7] Otherwise, it implies that the FHVP value changes.
[8] The reason why marriage value is excluded from the premium for long leases.
[9] We also used the Savills (2016) enfranchised and unenfranchised Relativity curves to provide an alternative estimate of the impact of the reforms examined.

$$= E\left[\left(RCE^{990-0.5}_{Reform,t+0.5} - RCE^{T-0.5}_{t+0.5}\right) - S^{T}_{Reform,t} | exercised_t = T\right] \quad (9)$$

where:
$E\left[RCE^{990-0.5}_{Reform,t+0.5} - RCE^{T-0.5}_{t+0.5}\right]$ = expected uplift in the leasehold value
$S^{T}_{Reform,t}$ = post-reform premium, determined at the date the notice is served.

We assume that it takes six months for a lease extension transaction to be completed as this reflects the time available to the lessee to submit a claim to the Tribunal to keep it `alive'. The uplift term captures the anticipated payoff of extending the lease after the reforms have been introduced. It requires information about the post- and pre-reform enfranchised Relativity. Although the post-reform Relativity, $RCE^{990}_{Reform,t}$, is not observed, this problem is overcome by assuming that there is a one percentage point discount to the FHVP value for this very long lease, $RCE^{990-0.5}_{Reform,t+0.5} \approx 0.99$[10].

The Longstaff and Schwartz (2001) Least Squares Monte-Carlo simulation method is employed to derive the embedded option value which is subsequently added to the unenfranchised Relativity. A required input is the expected future asset price. We apply the conventional geometric Brownian motion model to capture future changes in the asset price:

$$dVE^{T} = \mu VE^{T} dt + \sigma VE^{T} dZ \quad (10)$$

where:
μ = growth rate (the drift)
σ = volatility
dZ = Wiener process
$dt = \delta$, time step

The parameter values in our simulation model are based on statutory values applied in professional practice, outlined earlier in describing the study context. Equivalent semi-annual rates for r_f, σ (using the standard assumption that asset prices are normally distributed) and μ are used in implementation.

Hedonic Models
A finite leasehold value relative to its FHVP value expressed in logarithms is:

$$lnVE^{T}_{t} = lnFHVP_t + lnRCE^{T}_{t} \quad (11)$$

The pre-reform enfranchised Relativity can be obtained from a hedonic apartment price model:

$$lnVE^{T}_{t} = X'\beta + lnRCE^{T}_{t} \quad (12)$$

where:
$X'\beta$ =apartment and location characteristics and time period which represents the FHVP value.

[10] This assumption is justified in our hedonic model estimate of the share of freehold premium.

The hedonic model yields an estimate of the enfranchised Relativity by controlling for the apartments' physical and location attributes and market conditions. In empirical implantation, the value of a very long lease is used to proxy the FHVP value as freehold apartments do not exist in England and Wales.

The lease length specifications used to capture the enfranchised Relativity are outlined in more detail in Andrew et al. (2022). They include (i) lease buckets and (ii) a right-tailed restricted cubic spline:

(i) $lnRCE_t^T = \sum \gamma \, D^T$ (13)

where:
$\gamma = RCE^T$
$D^T =$ lease bucket taking value of 1 if the lease length T falls within certain intervals and zero otherwise with the default bucket for lease lengths 900 and above years.

(ii) $lnRCE_t^T = \gamma_1 L + \sum_{k=1}^{K} \gamma_{k+1} (L - k_k)^3{}_+$ (14)

where:
k are the knot points
$L = L^{\infty} - L^T$
L = the difference between the existing lease and very long lease
$L^{\infty} =$ the very long lease (999 years)
$L^T =$ the existing lease

Data
We extracted leasehold and share of freehold data from Lonres in PCL between 2010 to 2016 which were then matched to transacted prices recorded by the Land Registry and supplemented by additional lease length and property characteristics information from the Registered Lease Information and the Ordinance Survey Address Base respectively. As in Bracke et al. (2018) and Lai and Milcheva (2021), apartments with leases between 250 to 899 years are eliminated due to a lack of observations. Their exclusion is unlikely to make a significant difference in modelling Relativity. We retrieved 22,377 observations but 4,734 are dropped by the estimator for being singletons. The descriptive statistics of the 17,643 observations used in estimation are displayed in table 1. Estimation of hedonic models using leasehold and share of freehold as separate subsamples led to further decreases in observations to 12,854 and 3,599 respectively due to the singleton issue.

[Insert Table 1 Descriptive Statistics here]

Table 1 Descriptive Statistics

	Leasehold					Freehold Share				
Continuous Variable	**Observations**	**Mean**	**Std. dev.**	**Min**	**Max**	**Observations**	**Mean**	**Std. dev.**	**Min**	**Max**
Price (£000s)	13,266	1124.60	1409.24	80.0	46013.3	4,377	1132.08	1183.30	155.0	28000.0
Lease length	13,266	290.33	362.24	1.0	999.0	4,377	605.37	436.91	20.0	999.0
Area (sq ft)	13,266	919.70	544.63	93.0	8268.0	4,377	957.76	527.68	154.0	6935.0
Discrete Variables	**Observations**	**Frequency**	**Percent**			**Observations**	**Frequency**	**Percent**		
Number of Bathrooms										
One bathroom	13,266	7,511	56.62			4,377	2517	57.51		
Two or more bathrooms	13,266	5,755	43.38			4,377	1860	42.49		
Floor Level										
Lower Ground	13,266	1,374	10.36			4,377	666	15.22		
Ground	13,266	2,098	15.81			4,377	995	22.73		
First Floor	13,266	2,730	20.58			4,377	970	22.16		
Second Floor	13,266	2,343	17.66			4,377	800	18.28		
Third Floor	13,266	1,812	13.66			4,377	490	11.19		
Fourth Floor	13,266	1,137	8.57			4,377	257	5.87		
Fifth or higher	13,266	1,772	13.36			4,377	199	4.55		
Maisonette										
No	13,266	11,345	85.52			4,377	3,513	80.26		
Yes	13,266	1,921	14.48			4,377	864	19.74		
Dwelling Condition										
In Need Full Refurbishment	13,266	61	0.46			4,377	8	0.18		
In Need Refurbishment	13,266	568	4.28			4,377	135	3.08		
Recently Refurbished	13,266	1,857	14.00			4,377	604	13.80		
New build	13,266	693	5.22			4,377	17	0.39		
Average Condition	13,266	10,087	76.04			4,377	3,613	82.55		
Garden										
No Garden	13,266	11,377	85.76			4,377	3,390	77.45		
Private Garden	13,266	1,076	8.11			4,377	698	15.95		
Communal Garden	13,266	813	6.13			4,377	289	6.60		
Car Parking										
No Car Parking Provision	13,266	13,132	98.99			4,377	3,793	86.66		
Private Car Parking	13,266	2,649	19.97			4,377	584	13.34		
Balcony										
No	13,266	10,752	81.05			4,377	3,753	85.74		
Yes	13,266	2,514	18.95			4,377	624	14.26		
Terrace										
No	13,266	12,274	92.52			4,377	4,044	92.39		
Yes	13,266	992	7.48			4,377	333	7.61		
Patio										
No	13,266	12,774	96.29			4,377	4143	94.65		
Yes	13,266	492	3.71			4,377	234	5.35		
Roof Terrace										
No	13,266	12,612	95.07			4,377	4,055	92.64		
Yes	13,266	654	4.93			4,377	322	7.36		
Nice View (Has a)										
No	13,266	11,645	87.78			4,377	3,980	90.93		
Yes	13,266	1,621	12.22			4,377	397	9.07		
Converted Flat										
No	13,266	12,093	91.16			4,377	3,673	83.92		
Yes	13,266	1,173	8.84			4,377	704	16.08		
Penthouse										
No	13,266	12,872	97.03			4,377	4,297	98.17		
Yes	13,266	394	2.97			4,377	80	1.83		
Block has Lift										
No	13,266	9,301	70.11			4,377	3,667	83.78		
Yes	13,266	3,965	29.89			4,377	710	16.22		
Block Size (nb. apartments)										
1-3	13,266	1,484	11.19			4,377	604	13.80		
4-14	13,266	5,516	41.58			4,377	2600	59.40		
15-24	13,266	1,166	8.79			4,377	334	7.63		
25-49	13,266	1,420	10.70			4,377	242	5.53		
50 plus	13,266	3,245	24.46			4,377	515	11.77		
missing	13,266	435	3.28			4,377	82	1.87		
Listed Building										
No	13,266	13052	98.39			4,377	4,262	97.37		
Yes	13,266	214	1.61			4,377	115	2.63		
Sale Price Verified by Land Reg										
No	13,266	4,897	36.91			4,377	936	21.38		
Yes	13,266	8,369	63.09			4,377	3,441	78.62		
Peppercorn ground rent						not applicable				
No	13,266	12,964	97.72							
Yes	13,266	302	2.28							

The Kruskal Wallis tests[11] indicate that the typical share of freehold apartment has a longer lease ($\chi_1^2 = 954.21, p < 0.001$), is more expensive ($\chi_1^2 = 29.25, p < 0.001$) and larger in size ($\chi_1^2 = 36.01, p < 0.001$). Few share of freehold apartments have short leases, a reflection of the market. None in this subsample have a lease length of less than 21 years and only 7.8% have lengths between 20 and 80 years, compared to 2.1% and 17.6% respectively in the leasehold subsample. A table displaying the distribution of lease lengths can be found in the appendix. Other notable differences include the tendency of share of freeholds to be in smaller buildings (73% compared to 53%), non-purpose-built apartments[12] (16% compared to 9%), to have a private garden (16% compared to 8 %) and no lift (16% compared to 30%).

Hedonic model results

Table 2 displays the results of our hedonic apartment price models. Models A and B are estimated on the combined sample, model C on the share of freehold subsample and models D and E on the leasehold subsample. Model A is the only model which excludes controls for lease length. Models B to D employ lease buckets to control for lease expiration. The wider bucket intervals in model C are necessary due to there being relatively fewer observations of the share of freehold apartments with short lease lengths. The lease length in model E is incorporated using a right-tailed restricted cubic spline function (Andrew et al., 2022). Model A fails the link test the for appropriate functional form implying that its estimates are likely to be biased. All the other models pass this diagnostic test.

In general, the estimates of the physical dwelling and building characteristics in the models are plausible. The default category lease bucket is the very long lease, defined to be 900 years and above. The pattern of the magnitude of the estimates of controls for lease length in models D and E validate the existence of Relativity.

Insert Table 2 Hedonic model results

[11] The Kruskal Wallis tests examines sample median differences.

[12] Buildings such as houses, or office blocks converted into apartments.

Table 2: Hedonic model results

	Model A		Model B		Model C		Model D		Model E	
log area	0.974***		0.963***		0.963***		0.962***		0.963***	
Bathrooms (Default 1 Bathroom)										
Two plus Bathrooms	0.0615***		0.0538***		0.0489***		0.0551***		0.0543***	
Floor (Default Basement)										
Ground Floor	0.189***		0.192***		0.204***		0.194***		0.195***	
First Floor	0.228***		0.233***		0.222***		0.247***		0.247***	
Second Floor	0.200***		0.205***		0.195***		0.217***		0.218***	
Third Floor	0.176***		0.186***		0.158***		0.206***		0.206***	
Fourth Floor	0.161***		0.170***		0.136***		0.192***		0.193***	
Fifth or more	0.221***		0.226***		0.219***		0.241***		0.241***	
Multiple Floors (Default Single level)										
Multiple Floors	-0.0236**		-0.0217***		-0.0200		-0.0188*		-0.0191*	
Dwelling Condition (Default Average)										
New Build	0.0796***		0.0761***		0.200*		0.0670***		0.0661***	
Refurbished	0.0926***		0.0661***		0.0601***		0.0710***		0.0705***	
In Need of Refurbishment	-0.131***		-0.0732***		-0.0471**		-0.0775***		-0.0823***	
In Need Full Refurbishment	-0.179***		-0.0963***		-0.130**		-0.0834***		-0.0805*	
Garden (Default No Garden)										
Private Garden	0.0837***		0.0857***		0.0744***		0.0918***		0.0918***	
Communal Garden	-0.0105		-0.000738		0.0171		-0.00898		-0.00713	
Amenities (Default none)										
Balcony	0.0475***		0.0452***		0.0645***		0.0363***		0.0355***	
Terrace	0.0470***		0.0386***		0.0423***		0.0365***		0.0377***	
Patio	-0.00495		-0.00325		0.00649		-0.00326		-0.00541	
Roof Terrace	0.0242**		0.0209**		0.0255		0.0184		0.0187	
View	0.0432***		0.0440***		0.0456***		0.0427***		0.0413***	
Car_Parking (Default No Parking)										
Parking (Allocated Parking or Garage)	0.00908		0.00937		-0.00505		0.0101		0.0109	
Flat Type (Default Purpose Built)										
Converted Flat	-0.0149*		-0.0138**		-0.00963		-0.0151*		-0.0163*	
Lift (Default - No lift)										
Lift	0.0230***		0.0214***		0.0535***		0.0158**		0.0169***	
Penthouse Unit (Default - No)										
Penthouse	0.103***		0.0988***		0.0155		0.120***		0.118***	
Size of Block (Default - 1 to 3 units)										
4-14	0.0250*		0.0288**		0.0418*		0.0168		0.0178	
15-24	0.0290		0.0243		0.0166		0.0322		0.0358*	
25-49	-0.0144		0.00413		-0.0464		0.0289		0.0320	
50 plus	0.00311		0.0110		0.0305		0.00666		0.00621	
missing	0.0243		0.0195		0.0141		0.0289		0.0284	
Listed Building	-0.00161		0.00157		-0.00353		-0.00232		0.00299	
Peppercorn rent	0.106***		0.00318		n.a.		0.0000328		-0.0009553	
Land Registry Verified	-0.00615		-0.00371		-0.0270**		0.000252		-0.0010701	
Freehold Share Premium	0.0363***		0.0123*		n.a.				n.a.	
		Buckets		**Buckets**		**Buckets**		**Cubic Spline**		
		1-10 yrs	-1.391***	1-70 yrs	-0.0331*	1-10 yrs	-1.399***	Linear	-0.0000410***	
		11-20 yrs	-0.774***	71-80 yrs	0.0121	11-20 yrs	-0.807***	Knot 90	-0.0000140***	
		21-30 yrs	-0.509***	81-90 yrs	-0.0143	21-30 yrs	-0.538***	Knot 85	0.0000158***	
		31-40 yrs	-0.358***	91-99 yrs	-0.00757	31-40 yrs	-0.390***	Knot 45	-0.0000169***	
		41-50 yrs	-0.262***	100-149 yrs	0.000861	41-50 yrs	-0.296***	Knot 15	-0.000219*	
		51-60 yrs	-0.172***	151-250 yrs	-0.0307	51-60 yrs	-0.205***			
		61-70 yrs	-0.0916***			61-70 yrs	-0.131***			
		71-80 yrs	-0.0288**			71-80 yrs	-0.0671***			
		81-90 yrs	-0.0391***			81-90 yrs	-0.0621***			
		91-100 yrs	-0.00870			91-100 yrs	-0.0300**			
		101-125 yrs	-0.00851			101-125 yrs	-0.0306**			
		126-150 yrs	0.00289			126-150 yrs	-0.0275*			
		151-250 yrs	-0.00641			151-250 yrs	-0.0316**			
Location FE	Yes		Yes		Yes		Yes		Yes	
Year and Quarter FE	Yes		Yes		Yes		Yes		Yes	
N	17643		17643		3559		12584		12584	
F	(33,4542)=675.73		(46,4542)=710.39		(37,1177)=217.99		(45,3379)=512.34		(37,3379)=661.66	
Adjusted R^2	0.9286		0.9554		0.959		0.9563		0.958	
Within R^2	0.7735		0.8586		0.8546		0.8605		0.8666	
Link Test	Fail		Pass		Pass		Pass		Pass	

p-values in parentheses: * p < 0.05, ** p < 0.01, *** p < 0.001

We use the share of freehold apartments to assess the freehold premium whereas existing hedonic studies (Giglio et al. (2015) and Lai and Milcheva (2021)) used houses, which is inappropriate given their very different physical characteristics and re-development potential. Model A includes a dummy to capture the share of freehold premium but as it fails the link test the estimate of 3.6% is likely to be biased. Model B includes lease buckets as controls for lease expiration and yields an estimated premium over a very long leasehold equal to 1.2%, in line with values employed in professional practice. The premium captures the financial advantages in extending the lease, greater control over ground rent determination and building management and maintenance expenditure, and development potential. It justifies our assumption of using 0.99 to represent the post-reform extended 990-year lease value in the simulation model.

The magnitude of the price discount can be derived from a lease bucket estimate using $1 - e^{\gamma}$, where e^{γ} represents Relativity. For example, in model D an apartment with a lease lying between 41 to 50 years sells at a $1 - e^{-0.296} = 25.6\%$ price discount compared to an identical apartment on a very long lease. Lease bucket estimates in model B are well defined for shorter but not for longer lease lengths, as we would expect longer leases to be priced at a slight discount compared to the very long lease. Furthermore, the magnitude of price discount at around 80 years appears to be low. The estimates from model C present a probable explanation. For the share of freeholds, there does not appear to be any price discounts until leases have 70 or less years left[13]. Model C informs us that owning the freehold share does not protect a lessee from having to sell at a discount when the lease turns short. It suggests that adopting a commonhold as a collective form of freehold ownership rather expanding the share of freehold legal ownership system would provide greater protection to lessees from having to sell at a discount.

Model D yields the expected pattern of price discounts and Relativity. Compared to a very long lease, long leases have a Relativity of approximately 97% which decreases to 94% (or 6% price discount) at 80 years. This result also implies that lessees will benefit from a reform that increases the extended lease length from a long to a very long lease. Relativity begins to fall more steeply for leases lying between 81-90 years, supporting the observations made in Dixon et. el. (2000) and the Law Commission Valuation Report (2020) that steep price discounts only occur under 90 and 85 years respectively. The results reveal that non-linearities in Relativity are only significant in short leases. For longer lease lengths the decline is gradual.

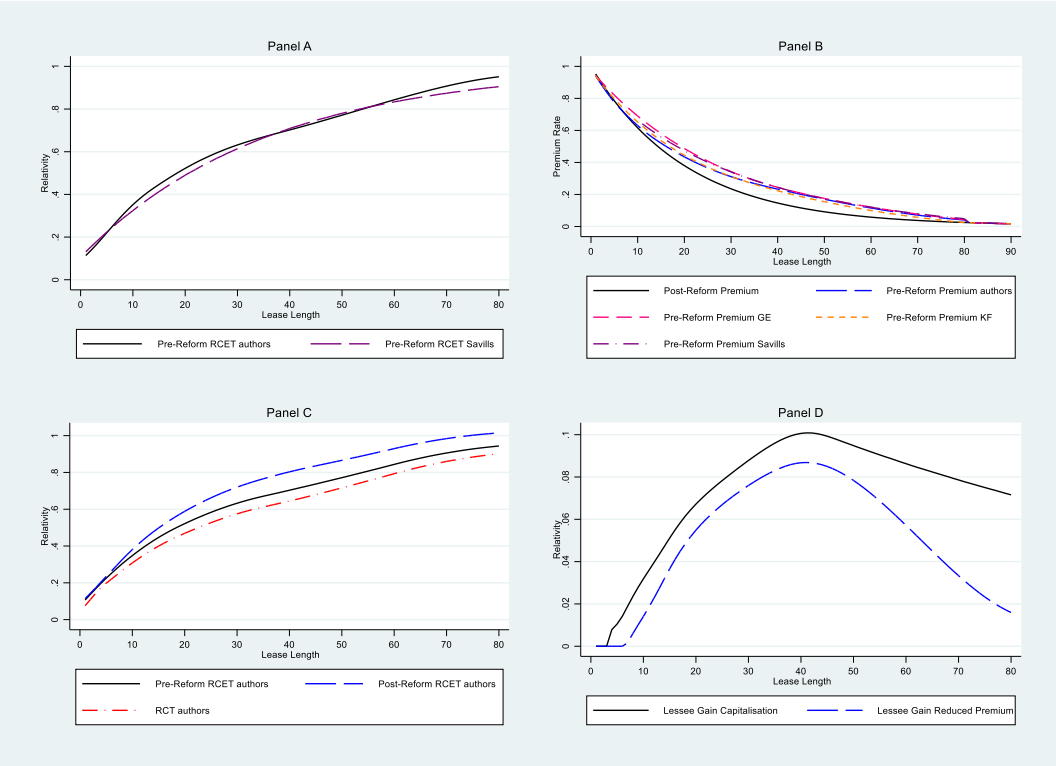
Andrew et al. (2022) applied different methods to model Relativity. We report the estimates of the right-tailed restricted cubic spline function as this model yielded plausible estimates of uplift gains, an unenfranchised Relativity curve which fitted data from Land Valuation Tribunal (LVT) outcome decisions reasonably well, generated plausible marriage values and lay within the range of unenfranchised curves applied in the surveying profession. The knots in the cubic spline are also robust to the incorporation of a simple dummy variable distinguishing short from longer leases. The cubic spline estimates are more readily interpretable via the derived enfranchised Relativity curve.

[13] In the share of freehold, the premium payable depends on the number of lessee's owning a freehold share, as the saving from having a share is reduced when there are more owners.

Panel A in figure 2 compares our enfranchised Relativity curve (pre-reform RCET) with the one reported by Savills (2016). The Savills (2016) curve is derived from the same data source but uses a different method. Our enfranchised Relativity curve lies above Savills (2016) as the lease turns short but falls more steeply until about 40 years when its decrease becomes shallower.

[Insert Figure 2 Relativity Curves, Premiums and Lessee Financial Gains here]

Figure 2: Relativity Curves, Premiums and Lessee Financial Gains



Numerical analyses

We next consider the wider financial implications of proposals to reduce the premium by eliminating the marriage value and standardising the extended lease length to 990 years.

Premium reduction: Lessor loss

Panel B in figure 2 reveals the implications for the premium if reform proposals are adopted, expressed relative to the FHVP value in decimals. The dotted lines represent the pre-reform premium calculated using the same deferment and capitalisation rates but different unenfranchised Relativity curves, namely from Knight Frank (KF), Gerald Eve (GE), Savills (2016) and our curve (authors) derived in Andrew et al. (2022). The gaps between them highlight the Relativity issue and why disputes in extension negotiations arise. The post-reform premium is represented by the bold line and is significantly lower for leases lying between 80 to 20 years. The gap between the pre- and post-reform premium indicates the extent of its reduction.

The average premium reduction is expected to be worth between 4.7% to 7.5% of the FHVP value and the maximum reduction to lie between 7.9% (Knight Frank) to 11.0% (Gerald Eve), depending on the unenfranchised Relativity curves used to calculate marriage value. A comparison of differences between the pre- and post-reform premium provides a reasonable estimate of the financial loss lessors will experience.

The unconsidered financial implications: Lessee gains

Reduction in price discount/Increase in Relativity

Our estimated post-reform enfranchised (RCET) and unenfranchised (RCT) Relativity curves are displayed in Panel C in figure 2. A similar graph using the Savills (2016) curves can be found in the appendix. Unequivocally, the post-reform enfranchised Relativity curve lies above the existing enfranchised Relativity curve, indicating an increase in the price of short leaseholds in the market, the extent to which varies by lease length. The estimated average and largest increases are worth about 7% and 10% of the FHVP value respectively. At very short lease lengths (20 years and less) the reform's impact is dampened due to reversionary value considerations. Long leases near 80 years will experience a slight rise in prices due to the anticipated reduction in the cost of renewing the lease at a future date.

Lessee financial gain

The graph in panel D in figure 2 displays the lessee's potential financial gain from either a premium reduction or increase in the short leasehold price. Lessees who extend their lease benefit from a premium reduction alongside the accompanying rise in the value of their apartment to its very long leasehold value (not shown in the diagram), which our hedonic model estimated to be around 3%. Lessees who do not extend their lease will also benefit from the premium reduction capitalisation into short leasehold prices and values, as any current or future listing of the apartment will lead to higher bids by buyers' due to the anticipated pay-off from extending the lease after making a purchase. For short leaseholds, the capitalisation gains are estimated to lie between 6% to 10% of the FHVP value. Ignoring this source of potential gain understates the overall financial impact of the premium reduction.

Impact of reform on the market

To examine the implications for the market, we estimate the change in the value of the stock of short and all leasehold dwellings[14]. We use the Land Registry and the Ordinance Survey Address Base to determine the stock of leaseholds and their lease lengths on the 15th April 2022. We obtain the FHVP at the sale date by applying our pre-reform enfranchised Relativity curve. Next, we inflate it by the Land Registry local authority house price indices to obtain the FHVP value in April 2022. We then use our pre-reform and post-reform enfranchised Relativity curves to calculate the current leasehold value. Dwellings which did not appear historically in the Land Registry Price Paid data had an estimate of a value based upon characteristics they share with neighbouring properties. We also calculated the post-reform stock value assuming all shorthold lessees renew the lease. A more detailed explanation is available on request.

[14] We eliminated leases 21 years and under to avoid capturing unenfranchisable leaseholds. We also exclude leaseholds in the social rented sector. This means that the total leasehold stock reported in table 2 will differ from the estimated leasehold stock reported by ONS.

We expect leasehold reform proposals to have varying regional impacts. Leasehold housing tends to be more common in regions which have or had large-scale landownership, industries who used it to provide homes for their employees and in urban areas with high density housing, since it is the more appropriate legal tenure for ensuring obligations to maintain buildings are met. Leaseholds provide a more affordable entry into homeownership and tend to be found in regions with high housing demand, higher property values and relatively lower wages. Different regions also have different propensities to create leaseholds from new builds. These factors explain the size of the leasehold market in each region. In addition, as table A2 in the appendix reveals, there have been regional variations in originating lease lengths and lease renewal rates, which explain the differences in the size and distribution of the short leasehold stock. For example, the North West stands out as a region where very long leases tend to be granted (999 years and more) and the East Midlands as a region where a relatively high proportion of short leases tend to be issued, which partly explains why the respective regions have a relatively smaller and higher proportion of short leasehold stock. The other reason is regional differences in lease renewal rates. We find that the implied non-renewal rates are very high for the West Midlands, Wales and North East. We therefore present a regional analysis. Table 3 displays the results.

[Insert Table 3 Impact of Reform on the Market here]

Table 3: Impact of Reform on the Market

Region	Total Leasehold Stock[15]	Short Leasehold Stock	Short Leaseholds: Average Lease Length Remaining	Pre Reform Value (£bn)	Post Reform Value (£bn)	Change in Value (£bn)	Relative Change in Value (%)	Average Change per Leasehold	Leasehold Market Impact No Lease Extensions (%)	Leasehold Market Impact All Lessees Extended (%)
London	991,025	95,334	51	£45.8	£50.0	£4.2	9.1	£43,942	0.8	2.6
West Midlands	330,697	99,980	43	£19.3	£21.6	£2.2	11.5	£22,297	4.9	18.6
South East	529,377	58,619	55	£13.2	£14.5	£1.3	9.5	£21,338	0.9	2.4
East	279,956	32,239	55	£6.7	£7.3	£0.6	9.5	£19,554	1.0	2.5
Wales	133,315	34,787	43	£6.3	£7.0	£0.7	11.3	£20,278	3.7	12.2
North East	174,442	39,855	52	£6.0	£6.6	£0.6	10.9	£16,262	3.1	7.4
South West	274,226	23,426	48	£4.6	£5.0	£0.4	9.3	£18,023	0.6	2.5
Yorkshire and Humberside	270,565	24,106	42	£3.8	£4.2	£0.4	9.7	£15,247	0.7	3.7
North West	836,586	18,875	46	£3.4	£3.7	£0.3	9.6	£17,126	0.2	0.6
East Midlands	113,644	12,033	41	£1.9	£2.1	£0.2	9.0	£14,105	0.9	4.8
Overall	3,933,833	439,254	48	£110.9	£121.8	£10.9	9.9	£24,896	1.0	3.2

The table displays for each region the total stock of leaseholds and short leaseholds, the average lease length of a short leasehold, the pre- and post-reform value of the stock of short leaseholds, the change and the percentage change and the weighted average value increase of the short leasehold stock. The penultimate column reports the percentage change weighted by the stock of all leaseholds to represent the underlying pressure on prices in the entire leasehold market. These columns represent

[15] Note that these figures exclude unenfranchisable leaseholds and leaseholds in the social rented sector.

the immediate effect of the reform from the capitalisation of reduced premium into short leasehold prices, assuming no lease extensions. Since the post-reform premium is significantly less expensive, it is likely to encourage lessees to renew their leases. The final column presents the percentage change weighted by the stock of all leaseholds but this time assuming all short leaseholds are extended. This assesses its potential longer-term impact.

London and the North West have the largest stock of enfranchiseable leaseholds while the East Midlands and Wales have the smallest. Short leaseholds comprise about 11.2% of the total stock of leaseholds. The average short lease length is 48 years. We estimate the immediate impact of the reforms will increase this stock value by £10.9 bn, equivalent to an average price increase of 9.9% per short leasehold, which translates to a 1.0% rise in prices in the leasehold market. However, the reform's immediate impact is not homogenous across the regions because the stock, lease lengths and the regional price of housing varies. The West Midlands, London and the South East have the largest stock of short leaseholds. The expected increase in stock value is highest at £4.2 bn for London, followed by the West Midlands at £2.2 bn and the South East at £1.3 bn. For London, this translates to an average value increase of £43,942 due to it being a higher house price region, compared to £22,297 in the West Midlands and £21,338 in the South East. Leases in the Midlands, Yorkshire and Humberside and Wales are relatively short, which partly explains why the average value increase in the West Midlands is predicted to be slightly above the South East even though its housing is less expensive. The mid-size regional markets which include the North East, Wales and Eastern are projected to rise by £0.6 to £0.7 bn, with increases in average values lying between £16,262 to £20,278. The predicted increase in the smaller regional markets is between £0.2 bn to £0.4 bn with average value rises ranging from £14,105 to £18,023. For the North East, West Midlands and Wales, there could be further implications for general housing affordability as short leaseholds form a high proportion of the total leasehold stock, with estimated price rises of 3.1%, 4.9% and 3.7% respectively[16].

The final column provides a gauge of the maximum or cumulative impact on the leasehold market as it assumes that all short leaseholds are renewed at the same time. It reveals that there could be significant issues for housing affordability for individuals wishing to purchase in the West Midlands, Wales, North East and East Midlands, with prices rising by 18.6%, 12.2%, 7.4% and 4.8% respectively. Other regions are projected to experience price increases between 2.4-3.7%. The only region insulated from the impact is the North West because the vast majority of its leasehold stock is on a long lease.

Distribution of financial gains among different lessee types

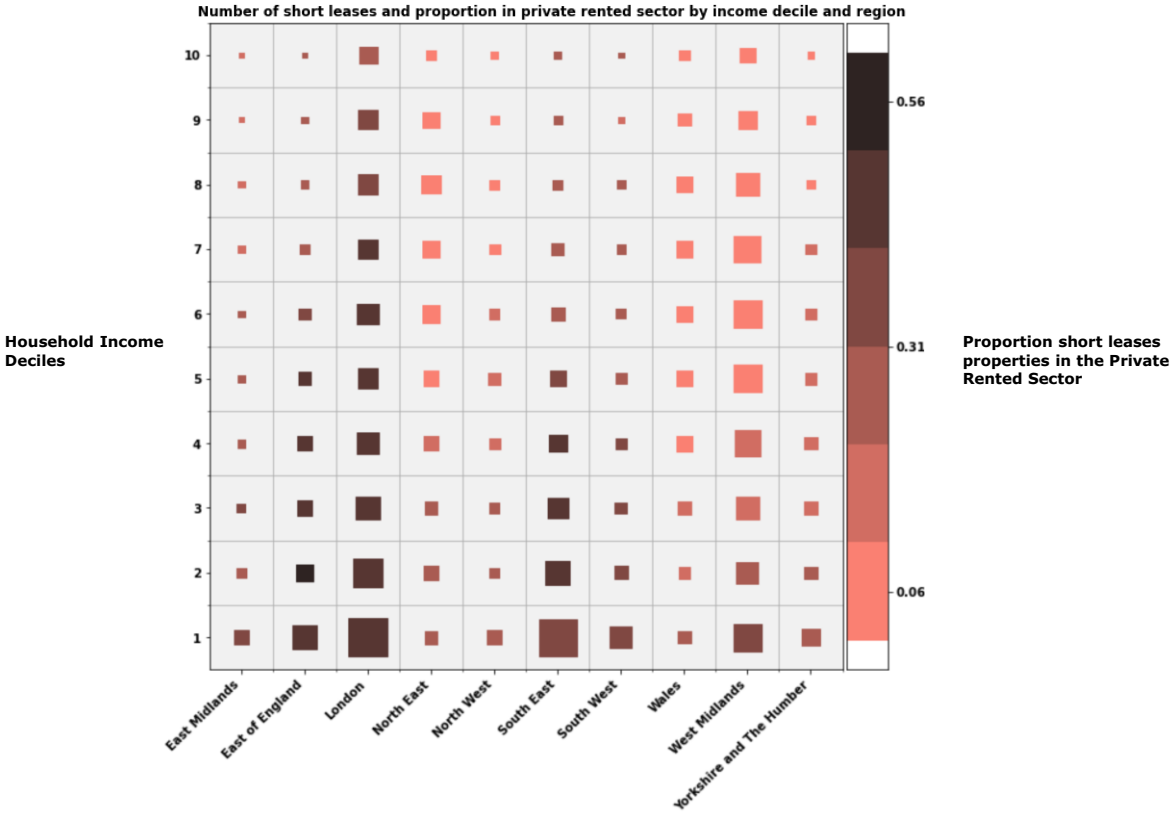
Next, we incorporate Experian's household tenure[17] and household income datasets to assess the regional distribution of the financial gain among different types of lessees. We group household occupancy type into regional income deciles. Figure 3 displays the matrix.

[16] Short leaseholds comprise of 30.2%, 22.8% and 26.1% the total leasehold stock in the West Midlands, North East and Wales respectively.

[17] Whilst the datasets are modelled Experian provide detailed breakdowns of calibrations and tests to show this should be a robust estimation of the distribution of household tenures.

[Insert Figure 3 Matrix of financial implications by household income and housing tenure here]

Figure 3: Matrix of financial implications by household income and housing tenure



The size of the square represents the total number of short leaseholds within a particular regional income decile. A larger square denotes more dwellings, and its size can be compared within and across regions. The colour shade displays the proportion of short leaseholds rented in the PRS by a household. The darker the shade the higher the proportion. We refer to households in income deciles 1 to 3 as low-income, 4 to 7 as middle-income and 8 to 10 as high-income. Using four lessee categorisations helps to present a clearer pattern to draw out implications.

From the matrix, we can infer the potential financial gains for high-, middle- and low-income homeowner and investor lessees by examining the distribution of the short leasehold stock among them from different spatial perspectives. Where applicable, we report the number of dwellings and the relevant percentage share in brackets next to the text. A national comparison based on the share of the short leasehold stock in England and Wales identifies the main financial beneficiaries of a premium reduction, an inter-regional comparison reveals the degree of the concentration of lessee types among the regions while an intra-region comparison informs us the largest group who will benefit financially within each region[18].

[18] Short leaseholds are heavily discounted and present opportunities for affordable homeownership and investment in housing. However, there is no information available that allows us to differentiate the extent to

National Comparison

In England and Wales just under a third (142,264, 31.7%) of the short leasehold stock are rented out in the PRS, mainly to low- (114,482, 18.5%) and middle-income (44,407, 9.8%) households. There is a very similar split between low-income (114,482, 25.5%) and middle-income (128,693, 28.7%) households owning and occupying dwellings on short leases. High-income households are in a minority as renters (15,428, 3.4%) and as homeowners (63,034, 14.1%).

Inter-Region Comparison

Our inter-region comparison is based on each region's share of the four broad lessee types. Investments are heavily concentrated in London (33.0%), and to a lesser extent in the South East (17.9%), West Midlands (14.2%) and Eastern (11.1%). Low-income occupier lessees tend to reside around London (21.0%), South East (19.9%) and the West Midlands (17.4%). The West Midlands has the largest concentration of middle- (33.9%) and higher-income (26.9%) homeowner lessees. Other regions with relatively high proportions of middle- and high-income occupier lessees include London (12.1%, 18.3%), North East (12.6%, 18.8%) and Wales (12.2%, 12.8%).

Intra-Region Comparison

Intra-region lessee patterns are characterised by similarities and contrasts. Within a region, the short leasehold stock in each income decile tends to be owner occupied rather than rented, except for the first two income deciles in London and the second decile in Eastern. Using the broad categorisation of lessee types, we find that the intra-region distribution is dominated by middle-income occupier lessees in Wales (15,667 44.7%), the West Midlands (43,577 43.2%), the North East (16,188 40.2%) and North West (6,949 35.5%) and by investors in London (46,766 47.8%), Eastern (15,846, 47.6%), South East (25,536 42.2%) and East Midlands (4,336 35.0%). Both low- (7,883, 32.0%) and middle-income (7,822, 31.8%) occupier lessees own the majority of the regional stock in Yorkshire and Humberside, while in the South West it is owned by low-income (8,294, 34.4%) occupier lessees and investors (8,808, 36.6%). Low-income occupier lessee rates are noticeably higher in less affordable regions where investors dominate, such as London (24,073, 24.6%), South East (22,822, 37.7%) and Eastern (9,966 29.9%), indicating that short leaseholds provide a route for low-income households to own a home. Regions with relatively high proportions of high-income income occupier lessees include the North East (11,821, 29.4%), Wales (8,059, 23.0%), North West (3,339, 17.1%) and West Midlands (16,983, 16.9%). London has the second largest number of high-income lessee occupiers, but they own the smallest share of its regional stock (11,553, 11.8%).

The income decile of renter households should indicate the quality of the short leasehold investment since low-income households are expected to rent lesser quality (cheaper rent) dwellings. Furthermore, investor lessees have an incentive to minimise maintenance expenditure on short leaseholds. We find that over 50% of short leaseholds in the private rented sector are rented by low-income households in each region, except in the North East (45.8%) and Wales (39.0%). Wales is the only region

which homeowners and investors allow a leasehold to turn short or actively purchase a short leasehold. Nor have we been able to find out the historical evolution of the quality of the regional short leasehold stock as a potential supply side factor to explain why the regional ownership differs across households in different income groups. We are only able to assess the reform's impact on the current profile of short leasehold ownership.

where most of this stock is let to middle-income households (43.3%). These figures inform us that investor lessees own lesser quality dwellings with lower FHVP values compared to most occupier lessees in the region and therefore should realise a lower windfall amount. They also reveal that short leaseholds provide affordable rented accommodation for low-income households. If the reforms induce investors to either sell up to realise the windfall gain or refurbish the extended leasehold to achieve a higher rental value, it will decrease the supply of cheap rented accommodation to low-income households. The second largest group renting within each region are middle-income households, except in Wales where it is low-income households (39.0%). Finally compared to the other regions, London (7,545, 16.1%) and Wales (821, 17.7%) have a significantly higher proportion the short leasehold rented stock let to high-income households.

To summarise, the distribution of the potential financial gain from an uplift in leasehold prices and the reduction in premium is not confined to low- and middle-income occupier lessees. A sizeable minority of high-income homeowners benefit too. The main recipients are investors. Investments are concentrated in London, although the West Midlands, South East and Eastern have relatively large numbers of short leasehold dwellings rented out. Short leaseholds tend to be rented by low-income households in higher house price regions. There could be an impact on the supply of cheap rented accommodation depending on how investors respond to the windfall gains. Nevertheless, there are investors who own higher quality stock, particularly in London. The second largest group to reap financial gains are expected to be middle-income lessee occupiers, who tend to live in the West Midlands. Low-income lessee occupiers tend to live in London and the southern regions. Given that there are more of them than middle income lessees in these regions, it indicates that purchasing a short leasehold provides an affordable route to homeownership. Within regional markets, middle-income occupier lessees are expected to be the main recipients of the windfall except for London, East Midlands, and the southern regions where investors dominate. In Yorkshire and Humberside, low- and middle-income homeowners are expected to be the main beneficiaries.

Future pipeline and leasehold price increases

The potential impact of a premium reduction on leasehold prices and the distribution of financial gains among lessees are likely to be much larger than that considered so far due to the pipeline of leases expiring. According to the Land Registry data, there are 96,530 and 252,059 leases that will turn short in the next 5 to 10 years respectively, of which approximately 40% and 21% are in London, 46% and 64% in the South East and 10% and 10% in Eastern, the least affordable regions in England.

Conclusions

This paper examines the broader financial implications of reducing the premium by removing the marriage value and standardising lease extensions to 990 years. Our hedonic model results validate the leasehold being a wasting financial asset, long leaseholds sell at a price discount to very long leaseholds and that a commonhold affords better protection from having to sell at a price discount than owning a share of the freehold.

Lessors incur a loss approximately equal to the premium reduction. Lessees who extend benefit from the reduced premium and from the increase in the extended leasehold value from a long to a very long lease. Leaseholders who decide not to extend also benefit from the rise in the underlying short leasehold value by the capitalisation of the premium reduction. The channel for the premium capitalisation is the increase in the anticipated payoff from extending a lease, which raises the option value embedded in the enfranchised leasehold price. The removal of the marriage value is likely to lead to large gains to short leasehold values and much smaller gains for those on long leases and very short leases. Taken together, these findings indicate that the potential financial gains to lessees are larger than those considered solely from a premium reduction.

There are further consequences. The projected rises in the immediate underlying values of the short leasehold stock in England and Wales are significant. The largest impacts occur in regions with either a large stock of short leaseholds (West Midlands) or a reasonable sized short leasehold stock in an expensive house price region (South East), or both (London). There are likely to be implications for housing affordability in areas where the short leasehold stock comprises of a high proportion of the total leasehold stock, namely the North East, West Midlands and Wales. Since the premium is much reduced, it is logical to expect that a significant number of short leaseholders will extend their lease. Based on the assumption all short leaseholds are extended, we show that this could lead to significant increases in leasehold prices and significant decreases in homeownership affordability, especially in the West Midlands, Wales, North East and East Midlands.

Among the lessee types, we find that the main beneficiaries will be investors, followed in descending order by middle-income, low-income, and high-income occupier lessees. Our inter-regional analysis reveals that short leasehold investments are concentrated in London, South East, West Midlands and Eastern, middle-income occupier lessees tend to live in the West Midlands and high-income occupier lessees in the West Midlands, London, North East and Wales. Low-income owner occupiers tend to live in London, South East and the West Midlands. The West Midlands is further distinguished by having a significantly higher number of short leaseholds rented out to middle- and high-income households.

Our analysis indicates that there are likely to be intra-regional variations in the distribution of financial gains among the different types of lessees. Within most regions, the main recipients are investors or middle-income occupier lessees. The exceptions are Yorkshire and Humberside where the financial gains are shared almost equally by low- and middle-income occupier lessees and the South West where they are shared almost equally between low-income homeowners and investors. Investors are the largest group to benefit in London, the southern regions and East Midlands

whereas middle-income occupier lessees are the main recipients in the West Midlands, North East, North West and Wales. High-income households own a relatively high proportion of the regional short leasehold stock in the North East, Wales, North West and West Midlands and low-income households in London, southern regions, East Midlands and the North West. We find that investors rent out lesser quality dwellings in higher house price regions, namely in London and the southern regions.

Dwellings on short leaseholds provide a route for low-income households to own, as they sell at a large discount to the FHVP value, or to rent a home. By raising the short leasehold values or encouraging existing lessees to extend to a very long lease, the proposed reforms are likely to lower homeownership affordability. We estimate that the reforms could lead to longer term price rises in London and the southern regions by an average 2.5%. Moreover, investors may be induced to sell up or encouraged to refurbish the extended lease to achieve a higher rental value, leading to a reduction in cheaper rented accommodation for low-income households.

Large prospective financial gains to higher-income homeowners and investors are unlikely to be the intended targets of reforms to alleviate the cost of extending a lease or acquiring the freehold and contradicts the levelling up policy espoused by the government. Its potential impact of decreasing housing affordability in the ownership and the private rented sectors also contradict the government aim of promoting housing affordability. Finally, the potential impact of a premium reduction on short leasehold prices and the leasehold market is likely to be much larger than that considered so far due to the pipeline of leases expiring, with the largest predicted flows in the next 5 and 10 years expected in London and the South East.

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Appendix

Table A1: Distribution of Lease Lengths

	Leasehold		Share of Freehold	
Lease Length	Frequency	Percent	Frequency	Percent
1- 19 years	281	2.1	0	0.0
20-29 years	153	1.2	1	0.0
30-39 years	298	2.2	4	0.1
40-49 years	264	2.0	4	0.1
50-59 years	265	2.0	19	0.4
60-69 years	554	4.2	118	2.7
70-80 years	518	3.9	191	4.4
81-90 years	699	5.3	227	5.2
91-99 years	1,705	12.9	492	11.2
100-125 years	3,791	28.6	652	14.9
126-150 years	918	6.9	75	1.7
151-250 years	1,006	7.6	88	2.0
900-990 years	1,534	11.6	1,440	32.9
990 and above years	1,280	9.6	1,066	24.4
Total	13,266	100.0	4,377	100.0

Table A1 displays the distribution of lease lengths in the leasehold and share of freehold subsamples. It is evident that there is a much higher proportion of share of freeholds with long lease (above 80 years) and very long leases (900 years and above).

Appendix: Estimation of the Current Stock of Short Leaseholds

We used the dataset of registered leases published by Land Registry and isolated those leases applicable to residential buildings by joining them to Ordnance Survey's Address Base product. We then processed the resulting dataset using unique property identifiers (UPRNS) to remove those registered leases that applied to Head Leases on the buildings. We extracted from the dataset the date of the lease termination and then calculated the years remaining from the analyses date (15th April 2022). To get an understanding of the potential change in value revealed by the shift in the enfranchisement curve pre- to post-reform, we needed to obtain an estimate of the current freehold value of the leasehold properties. Using the Andrew et al. (2022) pre-reform enfranchisement curve, we inflated the sale price of leaseholds present in the Land Registry Price Paid dataset (LRPP) by the years remaining at their sale date to get an approximate freehold value. We then inflated these freehold values by the Land Registry local authority house price indices to get a current freehold value. Those properties that did not appear historically in the Land Registry Price Paid data we gave a value based upon characteristics they shared with neighbouring properties. To obtain the uplift in value we simply used the resulting calculated current freehold values to calculate the leasehold value, based on years remaining, obtained from using the Andrew et al. (2022) pre-reform enfranchisement curve then subtracted the leasehold value obtained using the post-reform enfranchisement curve described above. It should be noted that this is a conservative estimate as we have lost a small percentage of identified short leases in the varying matching processes that were needed to join disparate datasets. We could only match the required information for 439,254 out of 475,186 (in April 2022) identified short leaseholds in England and Wales.

Table A2: Distribution of Original Lease Lengths

	Original Lease Length					
Region	**Under 21 years (%)**	**Short lease (21-80 years) (%)**	**Long lease (81 to 998 years) (%)**	**Very long lease (999 years plus) (%)**	**Implied non-renewal rate (%)**	**Current percentage of short leasehold stock (%)**
North East	0.6	0.9	55.0	43.5	22.3	22.8
North West	0.2	0.3	32.6	66.8	1.9	2.3
Yorkshire and Humberside	0.6	2.9	63.9	32.6	6.2	8.9
East Midlands	1.5	3.7	65.2	29.7	7.3	10.6
West Midlands	0.6	1.4	86.4	11.6	29.5	30.2
East	0.7	0.9	77.2	21.2	10.8	11.5
London	0.5	0.7	69.1	29.7	9.1	9.6
South East	0.7	0.7	71.5	27.1	10.5	11.1
South West	0.8	1.8	49.2	48.2	6.9	8.5
Wales	1.8	2.8	63.5	31.9	24.4	26.1
England	0.5	1.0	59.9	38.6	9.8	10.6

The current distribution of short leasehold stock depends on the original lease length and the renewal rate. Columns one to four in table A2 reveal the distribution of originating lease lengths in each region. This table only reports the originating lease length from the start date of the current lease and not when a lease was issued to a dwelling for the first time. For example, a dwelling may have been a leasehold since 1900 but the table only displays the originating lease length when the current lease was granted, say in the 1960s. As far as we are aware, the initial original lease information is not publicly available. The fifth and sixth columns displays the implied renewal rates and the percentage of short leasehold stock.

Unenfranchisable leases are relatively rare (column 1). The North West stands out as a region where very long leases (999 years plus) tend to be issued, followed by the South West and North East. Conversely, short leaseholds tend to be granted in the East Midlands, Yorkshire and Humberside and Wales. The South West and West Midlands also have a higher percentage of short leases compared to other regions in England. This partly explains why the North West and South West have a low percentage of short leasehold stock. But as the table highlights, the North East has a high percentage of the short leasehold stock despite having issued a relatively high percentage of long and very long leases.

We can use information on the original lease length and the existing stock of short leaseholds to estimate the implied non-renewal rate. The implied non-renewal rates are very high on the West Midlands, Wales and North East and identify the main reason why these regions have such a high percentage of short leaseholds.

Table A3: Impact of reform on the market (Savills (2016) Relativity Curves)

Region	Pre-Reform Value (£bn)	Post- Reform Value (£bn)	Number (April 2022)	Average Lease Length Remaining	Change in Value (£bn)	Relative Change in Value (%)	Average Change per Leasehold	Savills Change (%)
North East	5.9	6.5	39,855	52	0.6	9.7	£14,404	2.8
North West	3.3	3.6	18,875	46	0.3	8.7	£15,240	0.2
Yorks and Humb	3.7	4.0	24,106	42	0.3	8.7	£13,210	0.6
East Midlands	1.8	2.0	12,033	41	0.1	7.9	£12,000	0.8
West Midlands	19.2	20.9	99,980	43	1.8	9.2	£17,611	3.9
Eastern	6.5	7.1	32,239	55	0.6	9.2	£18,649	0.9
London	45.0	48.9	95,334	51	3.8	8.5	£40,327	0.8
South East	13.0	14.1	58,619	55	1.2	9.2	£20,250	0.9
South West	4.4	4.8	23,426	48	0.4	8.8	£16,678	0.6
Wales	6.2	6.8	34,787	43	0.6	9.1	£16,277	3.0
Overall	109.0	118.7	439,254	48	9.7	8.9	£22,026	1.8

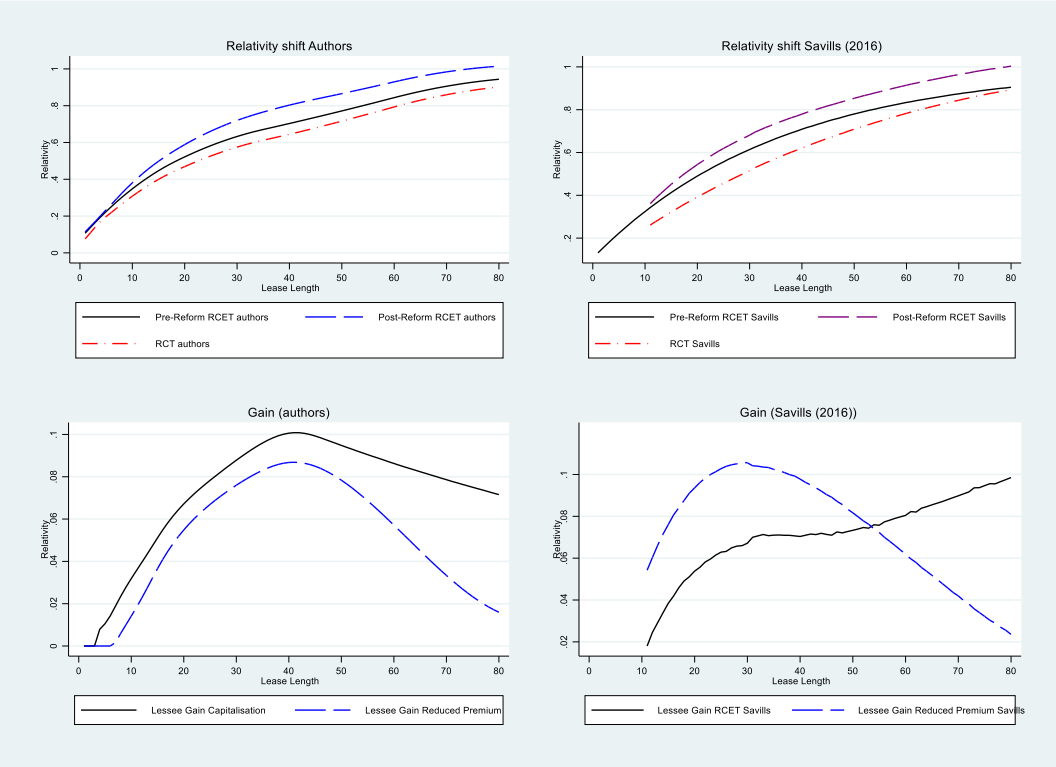
Applying the Savills (2016) Relativity curves yields broadly similar albeit slightly lower projections. This is due to Savills (2016) not reporting the unenfranchised Relativity curve for leases below 10 years which meant that we could not derive the post-reform enfranchised Relativities for these lease lengths. We assumed that the change in enfranchised Relativity is zero for these lease lengths, a reasonable assumption given that the revisionary value dominates their premium determination which is unaffected by the reforms being modelled.

The estimated projected increase in the total stock value is significant at £9.7 bn, equivalent to an average price increase of 8.9%. As before, the impact on the market is not homogenous across the regions because the stock, lease lengths and the regional price of housing varies. By stock, the West Midlands, London, the South East have large short leasehold markets, but it is in London where the expected increase in value is highest at £3.8 bn, followed by the West Midlands (£1.8 bn) and the Southeast (£1.2 bn). For London, this translates to an average price increase of £40,327 due to it being a higher house price region, compared to £17,611 in the West Midlands and £20,250 in the South East. Leases in the Midlands, Yorkshire and Humberside and Wales are relatively short and this partly explains why the average price increase in the West Midlands is predicted to be slightly above the South East even though it is a lower house price region. The mid-size regional markets which include the North East, Wales and Eastern are projected to rise by £0.6 bn, with increases in average prices lying between £14,404 to £18,649. The predicted increase for the smaller regional short leasehold markets is between £0.1 bn to £0.4 bn, with average prices rises ranging from £12,000 to £16,678. The estimates in the table also confirm those based on our Relativity curves that the impact on general housing affordability will be significant for the North East (2.8%), West Midlands (3.9%) and Wales (3.0%).

Table A4: Pipeline of leases turning short

Region	5 years	10 years
London	38,459	115,222
South East	19,784	46,574
East of England	9,163	25,379
South West	7,802	16,210
West Midlands	6,552	12,716
North West	4,619	12,954
East Midlands	3,472	7,414
Yorkshire and The Humber	3,225	7,066
Wales	2,053	4,636
North East	1,401	3,888
Grand Total	**96,530**	**252,059**

Figure AF 1: Comparing financial implication projections using authors and published Savills (2016) information



The figure displays the financial implication projections from our option pricing model using authors and published Savills (2016) information as inputs. The top two diagrams indicate a similar general pattern in the predicted post-reform enfranchised Relativity curve. It lies above the pre-reform and unenfranchised curves but begins to converge as the lease length expires. The bottom two diagrams compare projections about prospective financial curves. The profiles differ due to differences in the pre-reform and unenfranchised Relativity curves, which lead to different estimates of lessees benefiting from the reduction in the premium at each lease length and differences in magnitude of the gain from the increase in leasehold prices (upward shift in the enfranchised Relativity curves). Note that as Savills (2016) did not report unenfranchised Relativities for leases 10 years and under, we did not calculate prospective financial gains for those lease lengths.